

REMARKS

Claims 1-5 and 20 are pending in the application. Other claims have been withdrawn.

Claims 1-5 and 20 stand rejected under 35 USC §102 (e) over US Patent 6,563,993 to Imamura et al. (hereinafter, "Imamura"). This rejection is respectfully traversed.

Claim ¶1-c has been amended to recite that:

c) the light-extraction means comprising a single strip of material over the active section of the light pipe; said single strip having light-scattering material; the light-scattering material comprising inorganic material and being situated between the core of the light pipe and any fluoropolymer cladding on the light pipe that contacts said core, without extending into said core and without extending into said cladding.

New Claim 24 states that "the strip comprises a substrate with the light-scattering material."

Light-scattering material—according to the present specification—may comprise such inorganic materials as titanium dioxide or barium sulfate. P. 9, Lines 7-8. The specification teaches a number of ways of forming a strip including light-scattering material. Part 3, pages 7-9. According to three of these ways, the light-scattering particles will be situated between the core and any fluoropolymer cladding contacting the core, without extending into the core or extending into the foregoing cladding. These three ways are (1) using a substrate to hold light-scattering material, (2) applying a material such as paint containing light-scattering material to a core of a light pipe in co-extrusion process, and (3) applying light-scattering material with a simple adhesive sticker or by paint to a clad-less light pipe. These three ways are now considered in more detail.

1. Substrate for holding light-scattering material

As stated at p. 5, lines 15-17, "a strip 56b [Fig. 5] of light extraction means" may comprise "a substrate with light-scattering material." The following shows the definition of various meanings of "substrate" from MCGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS (6th ed. 2003) at 2061:

substrate [BIOCHEM] The substance with which an enzyme reacts. [ECOL] The foundation to which a sessile organism is attached. [ELECTR] The physical material on which a microcircuit is fabricated; used primarily for mechanical support and insulating purposes, as with ceramic, plastic, and glass substrates; however, semiconductor and ferrite substrates may also provide useful electrical functions. [ENG] Basic surface on which a material adheres, for example, paint or laminate. [ORG. CHEM] A compound with which a reagent reacts.
('sɒb, stræt)

The only relevant definition of "substrate" is the "engineering" ("ENG.") definition, stating: "Basic surface on which a material adheres, for example, paint or laminate." The claimed "substrate with light-scattering material" thus means "a basic surface on which a material adheres"—such material here being light-scattering material. The light-scattering material may be provided adhered to the substrate, or provided with a carrier, such as paint.

Fig. 15 shows how such a substrate-containing strip can be "inserted between core 87 and clad 84 in a co-extrusion process. Notably, round nozzle 87a for core 87 does not accommodate strip 88. Nor does the tubular-shaped nozzle 85a for clad 85 accommodate strip 88. Instead, strip 88 is separately fed into the space between core nozzle 87a and clad nozzle 85a. As a result, the light-scattering particles—claimed as inorganic—do not extend into either the core 87 or into the clad 85.

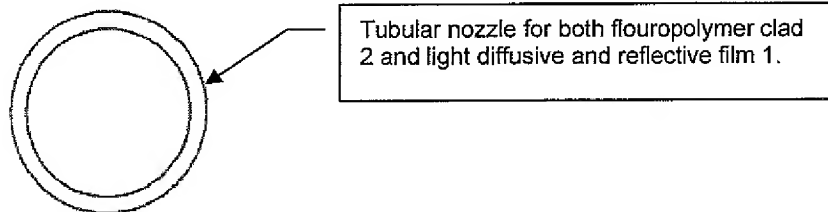
2. Paint containing light-scattering material applied in co-extrusion process

Fig. 16 shows how "[m]ultiple streams 102 of material form light-extracting material 96. Like the strip in Fig. 16, the streams 102 of material—which may comprise paint with light-scattering material—are not accommodated in either the round nozzle 99a for the core 99 or the tubular-shaped nozzle 101a for the clad 101. Instead, the streams 102 of material are fed into the space between clad nozzle 99a and core nozzle. As a result, the inorganic light-scattering particles do not extend into either the core 99 or into the clad 101.

3. Adhesive sticker or paint to clad-less light pipe

Where light pipes lack a cladding, the specification teaches a third way of forming a strip including light-extraction means, as follows: Apply light-scattering material "with a simple adhesive sticker * * * that is adhered to the light pipe," (page 8, lines 29-31); or "paint[ing] [the light pipe] to produce the desired pattern in the surface of the light pipe" (page 8, lines 31-32). As a result of either of the foregoing techniques, the inorganic light-scattering particles do not extend into either the core or into the (non-existent) cladding.

In connection with his Figure 2, Imamura teaches a "light diffusive and reflective film" 1 that extends into the cladding 2. As his Example 1 teaches, fluoropolymer material and material containing titanium dioxide are "co-extruded into a die so as to give a tubular clad having an outside diameter of about 12 mm and a thickness of about 0.8 mm." Col. 7, lines 55-57. The foregoing die would have a nozzle resembling:



By using the same tubular nozzle for both the cladding 2 and the light diffusive and reflective film 1, such film 1 will have "a thickness extending at least to the vicinity of the outer periphery of said clad in a direction perpendicular to the longitudinal direction of the clad, preferably, in a thickness extending as far as the outer periphery as shown in FIG. 1." Col. 5, lines 7-12. This is illustrated in the following Figure 2 of Imamura:

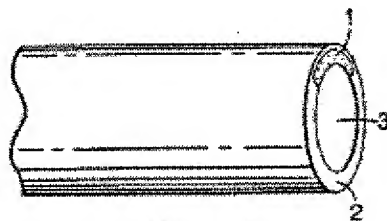


Fig. 2

Imamura alternatively teaches another geometry of his light diffusive and reflective film 1, as follows, in which the film extends into the core:

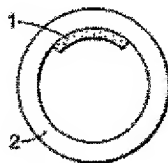


Fig. 3

Claim 1

Imamura thus teaches away from the claimed geometry of "the light-scattering material *
* * being situated between the core of the light pipe and any fluoropolymer cladding on the light

pipe that contacts said core, without extending into said core and without extending into said cladding.” As such, Claim 1 patentably distinguishes over Imamura.

New Claim 24

Imamura also fails to teach or suggest the features of new Claim 24, which recites “the strip compris[ing] a substrate with the light-scattering material.” As mentioned above, the relevant definition of “substrate” is “a basic surface on which a material adheres”—the “material” here being light-scattering material.

Imamura’s light diffusive and reflective film 1 is comprised of a mixture of resin and titanium dioxide particles, for instance. Example 1, Col. 7, lines 49-55. As such, the resin is not a basic surface on which a material, i.e., titanium dioxide particles, adheres. Rather, the resin is a matrix for the titanium dioxide particles.

Accordingly, Claim 24 distinguishes with even greater force over the prior art than its base Claim 1.

Consideration of generic claim under 37 CFR § 1.141 (a)

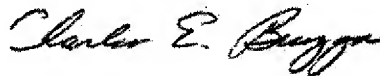
In view of the Allowability of Claim 1 reciting a “single strip” of light-extraction material, Applicants request consideration of claims to all subspecies reading on such “single strip” of material. See 37 CFR § 1.141 (a). The relevant subspecies includes Subspecies F, G and H. Further, all of these subspecies come within both Species A and Species B as understood by Applicants, as explained below.

In particular, as understood by Applicants, Species A as set forth in the Office Action dated Oct. 18, 2005, with Applicants’ clarifying insertions in brackets, concerns a light pipe with “light-extraction means compris[ing] a material other than a light-carrying portion of the light pipe[, including light-scattering material].” As understood by Applicants, Species B as set forth in the mentioned Oct. 18, 2005 Office Action, concerns a light pipe with “light-extraction means compris[ing] [a material other than] any fluoropolymer cladding on the light-carrying portion, including light-scattering material.” Applicants’ clarifications in brackets derive from the original Claim 1-c-ii recitation of “*material, other than a light-carrying portion of the light pipe or any fluoropolymer cladding on the light-carrying portion, including light carrying means*” (emphasis added). In the foregoing quote, all language except the clause set off by commas is italicized. Applicants intended that such clause pertain to “material,” and that the language of “including light-scattering means” following the clause, also pertain to “material.”

Applicants never intended to parse the foregoing quoted clause into two separate species, as the examiner has done in fashioning Species A and Species B. Such parsing would give rise to two unintended species having far greater scope than Applicants intended. In fact, the specification does not teach an embodiment concerning original Claim 1-c-ii other than a single material simultaneously fulfilling a first condition of being "other than a light-carrying portion of the light pipe" and a second condition of being "[other than] any fluoropolymer cladding on the light-carrying portion." (See, for instance, spec. at 8, lines 5-7, concerning a strip 88 of material that "is inserted between core 87 and clad 84 in a co-extrusion process," and thus simultaneously fulfils both of the foregoing conditions.) Hence, based on Applicants' intention of a more limited scope of original Claim 1-c-ii, together with their further clarification of the intended scope of Claim 1 by the present amendment, Species A and Species B should be consolidated. I certify that the foregoing document and any document(s) referenced below are being filed electronically with the USPTO using the private PAIR system on the date stated below.

Dated: May 26, 2006

Respectfully submitted,



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